

REMARKS/ARGUMENTS

Reconsideration of this application is requested. Claims 32-54 remain pending in the application subsequent to entry of this Amendment.

As an initial matter, in preparing this response an error has been noted in Table 1 on page 11 of the Amendment of August 19, 2008. It relates to the entry for Example 8 - the relevant column heading lists the metal as "Mg" which in fact is not correct. The correct metal is "Mn" or magnesium as Example 8 clearly shows. Attached is a corrected table showing this change.

In the Official Action claim 43 has been objected to as being a substantial duplicate of claim 36. Claim 43 has been amended to depend from claim 42, not claim 32, thus resolving the examiner's concerns as stated on page 2, first paragraph of the Official Action.

The balance of the Official Action deals with the rejection of all pending claims as being unpatentable over published Japanese application JP 2000-256529 of Matsumoto in view of US patent 6,454,848 to Sliwinski. Applicants traverse this rejection.

Molded products of white colored resin compositions (that is, the L value is large) which have a low-heat accumulating property (namely, preventing temperature rising) are well known. However, insofar as applicants are aware, prior to the present invention there are no known molded products of a blackish or dark colored resin compositions (the L value is small) which have a low-heat accumulating property (namely, preventing temperature rising).

In the present invention, by blending the specific inorganic pigment [B] (B-2, B-3, B-4) in the specific ratio, an blending it with [C] in combination and a resin to provide resin compositions having properties such that the L value is not more than 40 and the temperature rise thereof is not less than 50°C under the defined conditions.

The Examiner argues that the teaching of Matsumoto and Sliwinski can be combined yet no motivation has been clearly established based on the nature of the materials involved to suggest the combination.

As explained in applicants' previous response, the object of Matsumoto is to improve light resistance of a diene-based rubber-modified styrene-based resin.

Matsumoto's composition is:

(A) Diene-based rubber-modified styrene-based resin:

100 parts by mass

(B) Coloring agent:

4 to 20 parts by mass

(C) HALS and/or UVA

0.4 to 5 parts by mass

These compositions include the usual coloring agents and HALS and/or UVA.

"HALS" is the acronym for hindered amine light stabilizers while "UVA" the acronym for ultraviolet absorbers; see the attached pages from Ciba, a supplier of both types of these products, identifying these products including structures of exemplary compounds and explaining the manner in which they accomplish their respective objectives.

However, there is neither a description nor a suggestion that a low-heat accumulating property can be attained by blending the specific inorganic pigment [B] having an infrared-reflecting property into the specific thermoplastic resin in the specific ratio as defined in applicants' claims.

Sliwinski discloses a solid solution comprising a host component having a corundum-hematite crystalline structure, this host component comprising iron oxide, and a guest component, the guest component being incorporated into the crystalline lattice structure of the host component. The guest component includes metal oxides or precursors thereof having as cations the elements aluminum, chrome, and titanium, which solid solution is said to be useful as an inorganic color pigment. The solid solution has high reflectivity in the near infrared portion of the electromagnetic spectrum. Therefore, the solid solution is used as a coloring pigment capable of reducing heat derived from infrared and lower wavelengths because of its high reflectivity in the near infrared portion of the electromagnetic spectrum.

Sliwinski contains no description nor suggestion of the specific inorganic pigment [B] (B-2, B-3 and B-4) nor of blending this specific inorganic pigment into a specific resin according to the present invention and as defined in applicants' claims.

There is a fundamental difference between the two references. Applicants disagree with the examiner's comment "Matsumoto and Sliwinski are analogous art because they are concerned with the same technical difficulty, namely IR-reflective pigments" (page 3, second paragraph, first sentence) and also the comment on page 5, "Both references deal with IR-

refractive (reflective?) pigments". These statements are not consistent with common knowledge in this art nor do they agree with the technical information provided by a representative (but major) supplier of UVAs and HALS.

The fundamental difference lies in the mechanism of action of Matsumoto's UVA/HALS materials as discussed above and the IR-reflective pigments of Sliwinski.

The materials used by Matsumoto are an ultraviolet light absorbers, not reflectors. A UVA absorbs light energy which in turns changes the molecular structure of the absorber and thermal energy is released as the molecule reverts to its original molecular structure thereby changing harmful UV rays to harmless thermal energy.

A similar procedure occurs with the Hindered Amine Light stabilizers or HALS. HALS decompose a hydro-peroxide formed by light energy so that the hydro-peroxide is changed to a stabilized structure.

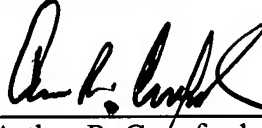
The mechanism of actions of the UVA/HALS materials are completely different from the IR-reflective pigments and these differences are well known by one of ordinary skill in the art and thus with these distinct differences in mechanism of action it cannot be correctly said that the two references constitute "analogous art" because only Sliwinski relies on IR-reflective pigments; Matsumoto does not.

For the above reasons it is respectfully submitted that the claims of this application define inventive subject matter. Reconsideration and allowance are solicited. Should the examiner require further information, please contact the undersigned.

Respectfully submitted,

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As to claim 1 (as above amended) in Sliwinski there is no description of using the specific resin according to the present invention. As to claim 17, there is no description of using the specific coloring pigment according to the present invention.

The following Table 1 shows the combination of components in Sliwinski.

TABLE 1

Ex.	Cr	Fe	Al	Ti	Mo	B	Bi	Sn	Si	Mn	In	La	Nd
1	X	X	X	X									
2	X	X	X	X									
3	X	X	X	X	X								
4	X	X		X		X							
5	X	X		X			X						
6	X	X	X					X					
7	X	X	X						X				
8	X		X	X						X			
9	X	X		X							X		
10	X	X		X								X	
11	X	X		X									X
12	X	X	X	X									
13	X	X	X	X									
14	X	X											
15	X	X	X	X									
16	X	X	X	X									
17	X	X	X	X	X								
18	X	X	X	X	X								
19	X	X	X	X	X								
20	X	X	X	X	X								
21	X	X	X	X									

X: Used

As seen from the above Table 1, there is no combination in the Examples of Sliwinski:

(B-2) a composite oxide of Fe and Mn

Raw Materials Database

Market Channels

Formulation Centers

Trends & Innovations
Solution Case StudiesMaterials
WebSe

Terpenic resins



TechDirect
Get technical
solutions to your
UV/Light Stabilizers
issues!



Ultraviolet Absorbers

UV/Light Stabilizers

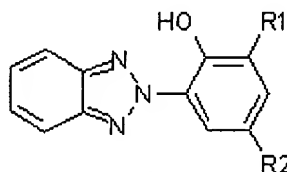
Basics on degradation

- Additive description
 - Ultraviolet Absorbers
 - Hindered Amine Stabilizers
- ▼ Benefits
- ▼ Sealant
- ▼ Hot-melt adhesives
 - Reactive Hot-melts
- ▼ Solvent based adhesives
- ▼ Water based adhesives
- ▼ Market
- Product Selector
- Why use Light Stabilizers?

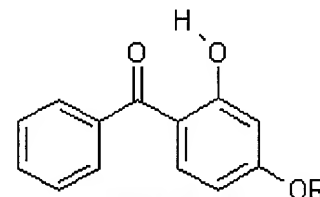
A very simple way to protect adhesives against UV light is to prevent UV absorber the amount of light absorbed by chromophores. This can be achieved by ultraviolet absorbers in the adhesives, which function by preferentially absorbing harmful UV light and dissipating it as thermal energy.

Such stabilizers function according to the Beer Lambert law, which specifies that radiation absorbed is a function of both sample thickness and stabilizer concentration.

In practice, high concentrations of absorbers and sufficient thickness of the polymer before enough absorption takes place to effectively retard photodegradation.



Benzotriazole



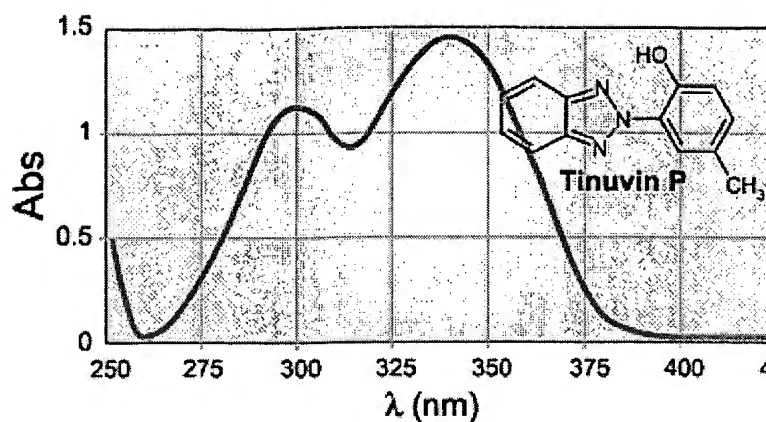
Benzophenone

Typical benzophenone and benzotriazoles structure

Benzophenone (Chimassorb® line) and **benzotriazole** (Tinuvin® line) are the most commonly used in adhesives and sealants.

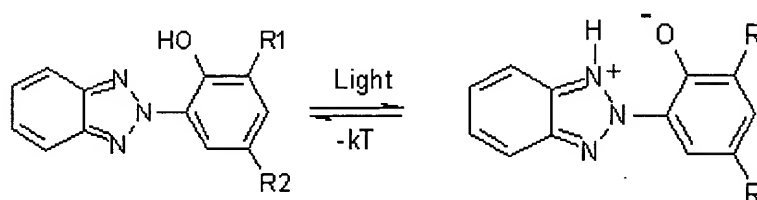
Mechanism of action of UV absorbers:

The different substituents in the benzotriazole group affect various properties, such as volatility, compatibility, physical condition and - last but not least - maximum absorption. Typical UV absorption spectra of benzotriazoles can be seen in illustration below.

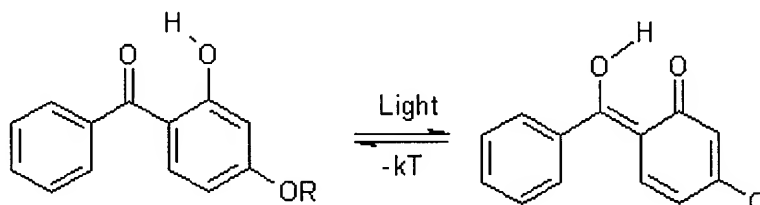


UVA spectra of Benzotriazoles

The absorption curves show that the requirements are met: strong absorption in the range between 295 and 400 nm and a large reduction in absorption in the visible range. The typical protection mechanism of benzotriazoles and benzophenones are illustrated in the schemes below.



UV absorption causes the electron density to move from the phenolic oxygen to the nitrogen. The nitrogen becomes more alkaline than the oxygen as a result and a proton transfer. The mesomeric form represents an excited state, which stabilizes as a result of a radiative transition to the ground state.



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Plastics & Rubber » Effects we offer » Durability & Protection » Light Stability & Weather Resistance » **Light Stabilizer**

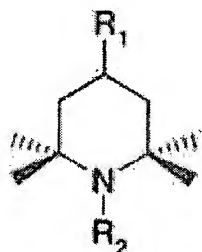
→ **Light Stabilizer**

← Back to Light Stability & Weather Resistance

» Light Stabilizer

We often classify the types of light or UV stabilizers we make according to their action mode: **UV absorbers** shielding the polymer from ultraviolet light or **hindered amine light stabilizers (HALS)** that act by scavenge intermediates formed in the photo-oxidation process.

Hindered Amine Light Stabilizers

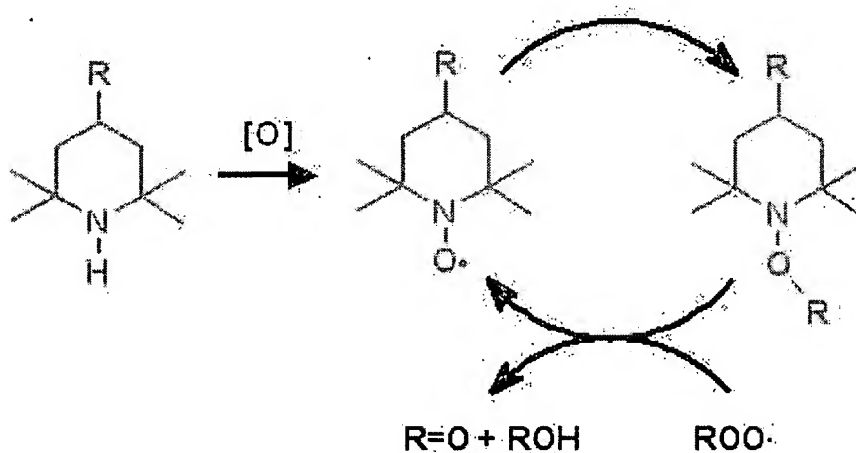


Hindered Amine Light Stabilizers (HALS) are extremely efficient light-induced degradation of most polymers.

They do not absorb UV radiation, but act to inhibit degradation by extending its durability. Significant levels of stabilization are achieved at low concentrations.

Characteristic structure of Hindered Amine Light Stabilizers

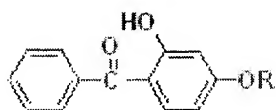
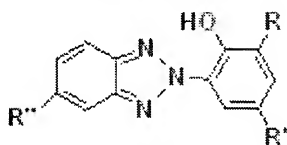
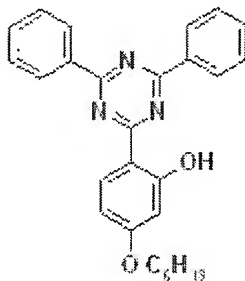
HALS' high efficiency and longevity are due to a cyclic process wherein the HALS are regenerated rather than consumed in the stabilization process. They also protect polymers from thermal degradation and can be used as thermal stabilizers.



Simplified Stabilization Mechanism of Hindered Amine Stabilizers

UV Absorbers

The unavoidable presence of catalyst residues in polymers or other c

**Benzophenone****Benzotriazole****Hydroxyphenyl Triazine**

from polymerization and processing can initiate the degradation proc

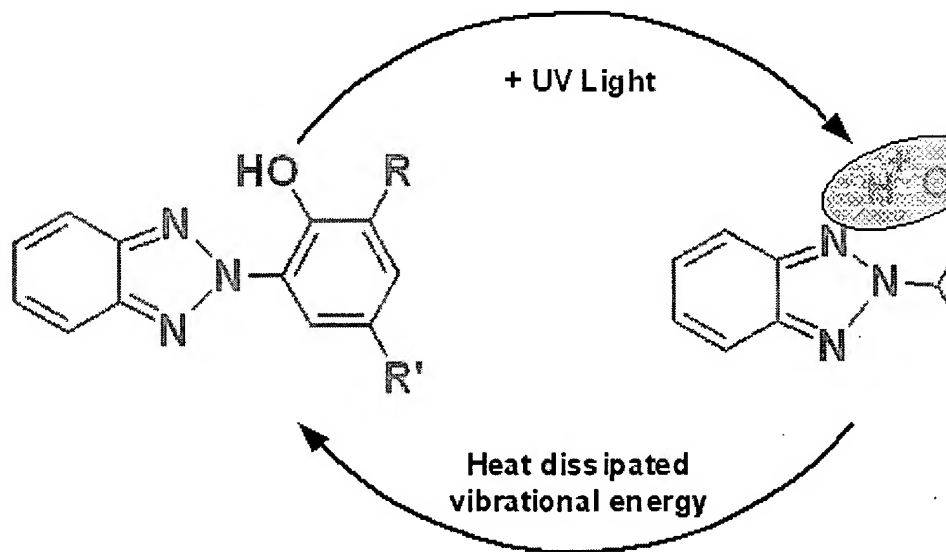
UV absorbers (UVA's) are often used to compete with these contami and preferentially absorb UV light.

UV absorbers are since long time well known as stabilizers of transpa plastics to protect the bulk of thick applications.

Color fading of full shade or tint colored plastics with organic pigmen prolonged by the use of UV absorbers.

Common UV Absorbers

UV absorbers have the property to convert the energy absorbed from UV light into heat, via a mechanism tautomerism. This heat can then dissipate through the substrate.



Energy dissipation in hydroxyphenyl-benzotriazole UV Absorbers

Thanks to this cyclic mechanism, UV absorbers can remain active during the life-time of the plastic article. subject to and limited by Lambert-Beer's law:

$$A = \epsilon \cdot b \cdot c$$

where absorbance, **A**, is equal to the extinction coefficient, **ε**, multiplied by the path length, **b**, and the concentration of the UVA, **c**.

Obviously this favors thick plastic articles (high path length **b**) with high concentrations (**c**) of very effectiv

absorbers.

In practice, however, the surface of the plastic cannot be completely protected. This is why these UV stabilizers are used together with products having a different stabilization mechanism (e.g. HALS), thus complementing and enhancing protection properties.

Products

HALS	UV Absorber
CHIMASSORB® 2020	CHIMASSORB® 81
CHIMASSORB® 944	TINUVIN® 213
TINUVIN® 111	TINUVIN® 234
TINUVIN® 123	TINUVIN® 326
TINUVIN® 494 AR	TINUVIN® 328
TINUVIN® 622	TINUVIN® 329
TINUVIN® 765	TINUVIN® 360
TINUVIN® 770	TINUVIN® 571
TINUVIN® 783	TINUVIN® 1577
TINUVIN® 791	TINUVIN® P
TINUVIN® B 75	TINUVIN® P
TINUVIN® NOR™ 371	
TINUVIN® XT 833	
TINUVIN® XT 850	

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